

## C 程式設計題

命題者：TWK

題目名稱(中文/英文)：Compute the square root

主要測試觀念：算式計算

### Basics

- ☒ C++ BASICS 1
- ☐ FLOW OF CONTROL
- ☐ FUNCTION BASICS
- ☐ PARAMETERS AND OVERLOADING
- ☐ ARRAYS
- ☐ STRUCTURES AND CLASSES
- ☐ CONSTRUCTORS AND OTHER TOOLS
- ☐ OPERATOR OVERLOADING, FRIENDS, AND REFERENCES
- ☐ STRINGS
- ☐ POINTERS AND DYNAMIC ARRAYS

### Functions

- ☐ SEPARATE COMPILATION AND NAMESPACES
- ☐ STREAMS AND FILE I/O
- ☐ RECURSION
- ☐ INHERITANCE
- ☐ POLYMORPHISM AND VIRTUAL FUNCTIONS
- ☐ TEMPLATES
- ☐ LINKED DATA STRUCTURES
- ☐ EXCEPTION HANDLING
- ☐ STANDARD TEMPLATE LIBRARY
- ☐ PATTERNS AND UML

**題目說明：** The Babylonian algorithm to compute the square root of a positive number  $n$  is as follows:

1. Make a guess at the answer (you can pick  $n/2$  as your initial guess).
2. Compute  $r = n / \text{guess}$ .
3. Set  $\text{guess} = (\text{guess} + r) / 2$ .
4. Go back to step 2 for as many iterations as necessary. The more steps 2 and 3 are repeated, the closer guess will become to the square root of  $n$ .

Write a program that inputs a double for  $n$ , iterates through the Babylonian algorithm until the guess is within 1% of the previous guess, and outputs the answer as a double to two decimal places. Your answer should be accurate even for large values of  $n$ .

輸入說明：391.00

輸出說明：19.77

I/O 範例：

	Sample Input	Sample Output
第一組測資與輸出	400.5	20.01
第二組	65189451651.5192165	255322.25
第三組	1894651654984.11318	1376463.46
...		

**附屬資料：**

☒解答程式： ComputeSQRT.cpp(檔名)

☒測試資料：input.txt, output.txt

☒ 易，僅需用到基礎程式設計語法與結構

☐ 中，需用到多項程式設計語法與結構

☐ 難，需用到多項程式結構或較為複雜之資料型態或結構

**解題時間：15 分鐘。**

**其他註記：**